

**Appendix C**  
**Hanna Region Transmission System Development**  
**Alternatives Details**

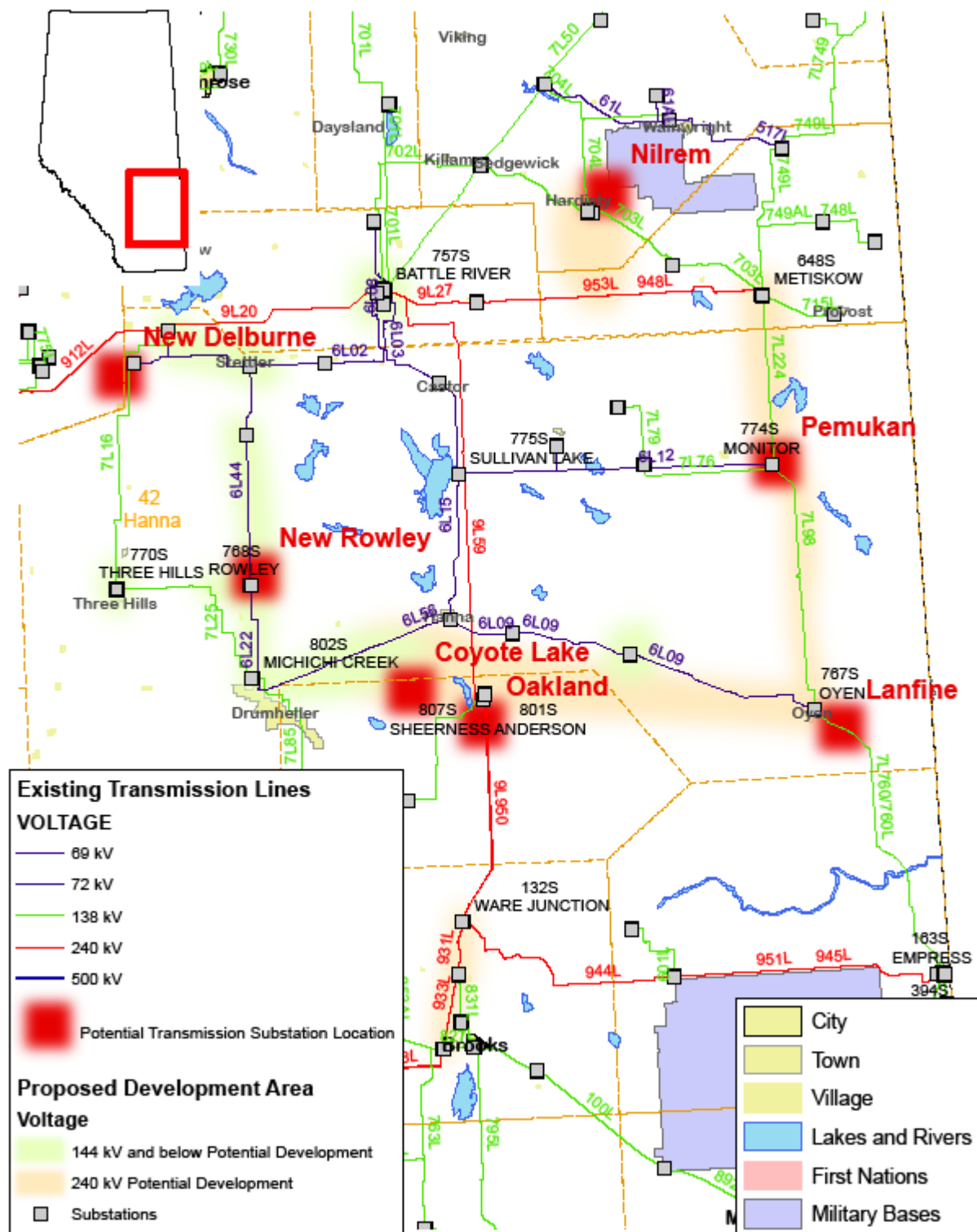
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## C1. Alternative 1 Detail

Figure C-1: Hanna Region Transmission System Development Alternative 1 – 2012



## **1.1 Substations and switching stations – 2012**

- 240 kV Nilrem 574S substation
- 240 kV Pemukan 932S substation
- 240 kV Lanfine 959S substation
- 240 kV Coyote Lake 963S substation
- 240 kV Oakland 946S switching station

## **1.2 Major system transformers – 2012**

- Nilrem 574S – two 400 MVA 240/138 kV transformers
- Pemukan 932S – one 300 MVA 240/144 kV transformer
- Lanfine 959S – one 300 MVA 240/144 kV transformer
- Coyote Lake 963S – one 300 MVA 240/144 kV transformer

## **1.3 Transmission lines – 2012**

- 240 kV double circuit line from Nilrem 574S to 240 kV line 9L953/953L to create an in-and-out scheme on 9L953/953L to Nilrem 574S – approximately 30 km with twin bundle 477 or 795 kcmil ACSR conductor
- 240 kV line 9L966 from Hansman Lake 650S to Pemukan 932S – approximately 60 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L46 from Pemukan 932S to Lanfine 959S – approximately 68 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L24 from Oakland 946S to Lanfine 959S – approximately 87 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L29 from Oakland 946S to Coyote Lake 963S – approximately 38 km with twin bundle 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV double circuit line 9L70 and 9L97 from Oakland 946S to Anderson 801S – approximately 7 km with twin bundle 477 or 795 kcmil ACSR conductors
- 240 kV line from Ware Junction 132S to West Brooks 28S – approximately 40 km with twin bundle 1033 kcmil ACSR conductor (double circuit line with single side strung)
- 138 kV double circuit line from Nilrem 574S to Tucuman 478S – approximately 3 km with 477 kcmil ACSR conductor
- 144 kV line 7L127 from Pemukan 932S to Monitor 774S – approximately 6 km with 477 kcmil ACSR conductor (double circuit line with single side strung)
- 144 kV line 7L132 from Lanfine 959S to Oyen 767S – approximately 6 km with 477 kcmil ACSR conductor (double circuit line with single side strung)
- 144 kV line 7L128 from Coyote Lake 963S to Michichi Creek 802S – approximately 42 km with 477 kcmil ACSR conductor

## **1.4 Voltage supporting facilities – 2012**

- Three SVCs ( $\pm 200$  MVar) each at Hansman Lake 650S, Pemukan 932S and Lanfine 959S
- Cap bank additions
  - 138 kV 27 MVar at Hardisty 377S
  - 144 kV 2\*30 MVar at Pemukan 932S
  - 144 kV 2\*30 MVar at Lanfine 959S
  - 144 kV 20 MVar at Three Hills 770S<sup>1</sup>
  - 144 kV 15 MVar at Stettler 769S<sup>2</sup>
  - 72 kV 10 MVar at Battle River 757S

## **1.5 Other system upgrades – 2012**

- Upgrade 138 kV 704L from Tucuman 478S to Hardisty 377S to 447 kcmil ACSR conductor
- Convert Stettler 769S to a 144 kV substation with a 33 MVA 144/72 kV tie transformer and add a 25 MVA 144/25 kV load transformer
- 144 kV line 7L143 from Nevis 766S to Stettler 769S – approximately 35 km with 477 kcmil ACSR conductor
- New 144 kV substation Heatburg 948S near Delburne 760S with a 144/25 kV 25 MVA load transformer (replacement of Delburne 760S)
- Approximately 1.6 km double circuit 144 kV line with 268 kcmil ACSR conductor from 144 kV line 7L16 to new Heatburg 948S to create an in-and-out scheme on 7L16 to Heatburg 948S
- New 144 kV substation Cornish Lake 954S near Rowley 768S with a 144/25 kV 25 MVA load transformer (replacement of Rowley 768S)
- Approximately 12 km 144 kV double circuit line with 268 kcmil ACSR conductor from 144 kV line 7L25 to new Cornish Lake 954S with an in-and-out scheme on 7L25 to Cornish Lake 954S
- Relocate Rowley 768S 72 kV 5 MVar cap bank to Youngstown 772S
- Reterminate 144 kV 7L79 from Monitor 774S to Pemukan 932S
- Reterminate 144 kV 7L98 from Oyen 767S to Lanfine 959S

## **1.6 Salvaging facilities – 2012**

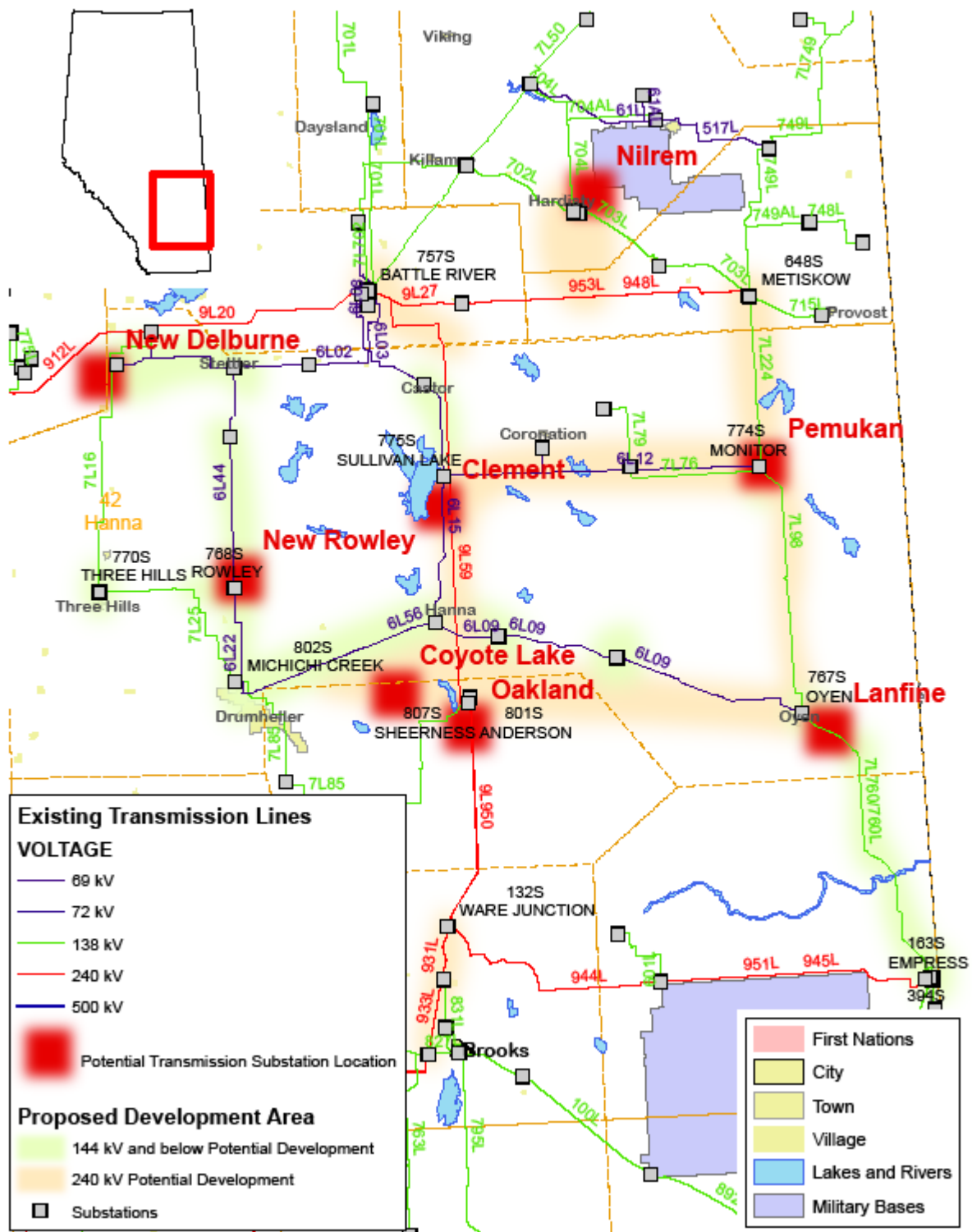
- 144 kV line 7L98 from Monitor 774S to Excel 910S
- 72 kV line 6L31 between Nevis 766S and Stettler 769S, including the tap to Delburne 760S
- Stettler 769S 72/25 kV transformers 601T and 602T
- Delburne 760S
- Rowley 768S
- 72 kV line 6L44 from Rowley 768S to Big Valley 778S
- 72 kV line 6L22 from Michichi Creek 802S to Rowley 768S

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<sup>1</sup> The size and number of the cap banks will be determined during facility application

<sup>2</sup> The size and number of the cap banks will be determined during facility application

Figure C-2: Hanna Region Transmission System Development Alternative1 – 2017



## **1.7 Substations and switching stations – 2017**

- 240 kV Clement 988S switching station

## **1.8 Major system transformers – 2017**

- Lanfine 959S – one 300 MVA 240/144 kV transformer
- Pemukan 932S – one 300 MVA 240/144 kV transformer
- Hansman Lake 650S – one 200 MVA 240/138 kV transformer

## **1.9 Transmission lines – 2017**

- 240 kV line 9L14 from Clement 988S to Pemukan 932S – approximately 90 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L06 from Clement 988S to Oakland 946S – approximately 81 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L49 from Halkirk 401S to Cordel 755S – approximately 17 km with 477 or 795 kcmil ACSR (double circuit line with single side strung)
- 240 kV double circuit line from 240 kV line 9L59 to Clement 988S to create an in-and-out scheme on 9L59 to Clement 988S – approximately 2 km with twin bundle 477 kcmil ACSR conductor
- 240 kV line 9L31 from Oakland 946S to Coyote Lake 963S – approximately 38 km with twin bundle 795 kcmil ACSR conductor – second side strung on the 240 kV D/C line
- 144 kV line 7L141 from Pemukan 932S to Monitor 774S – approximately 6 km with 477 kcmil ACSR conductor – second side strung on the 144 kV D/C line
- 144 kV line 7L151 from Lanfine 959S to Oyen 767S – approximately 6 km with 477 kcmil ACSR conductor – second side strung on the 144 kV D/C line

## **1.10 Voltage supporting facilities – 2017**

- Cap bank additions
  - 240 kV 2\*36 MVar at Hansman Lake 650S
  - 138 kV 27 MVar at Hansman Lake 650S
  - 138 kV 27 MVar at Metiskow 648S
  - 138 kV 2\*27 MVar at Nilrem 574S
  - 72 kV 5 MVar at Youngstown 772S
  - 25 kV 2.4 MVar at Coronation 773S

## **1.11 Other system upgrades – 2017**

- Convert Hanna 763S to 144 kV substation and relocate Michichi Creek 802S 144/72/34.5 kV transformer 701T to Hanna 763S
- 144 kV line 7L108 from Coyote Lake to Hanna 763S – approximately 40 km with 477 kcmil ACSR conductor



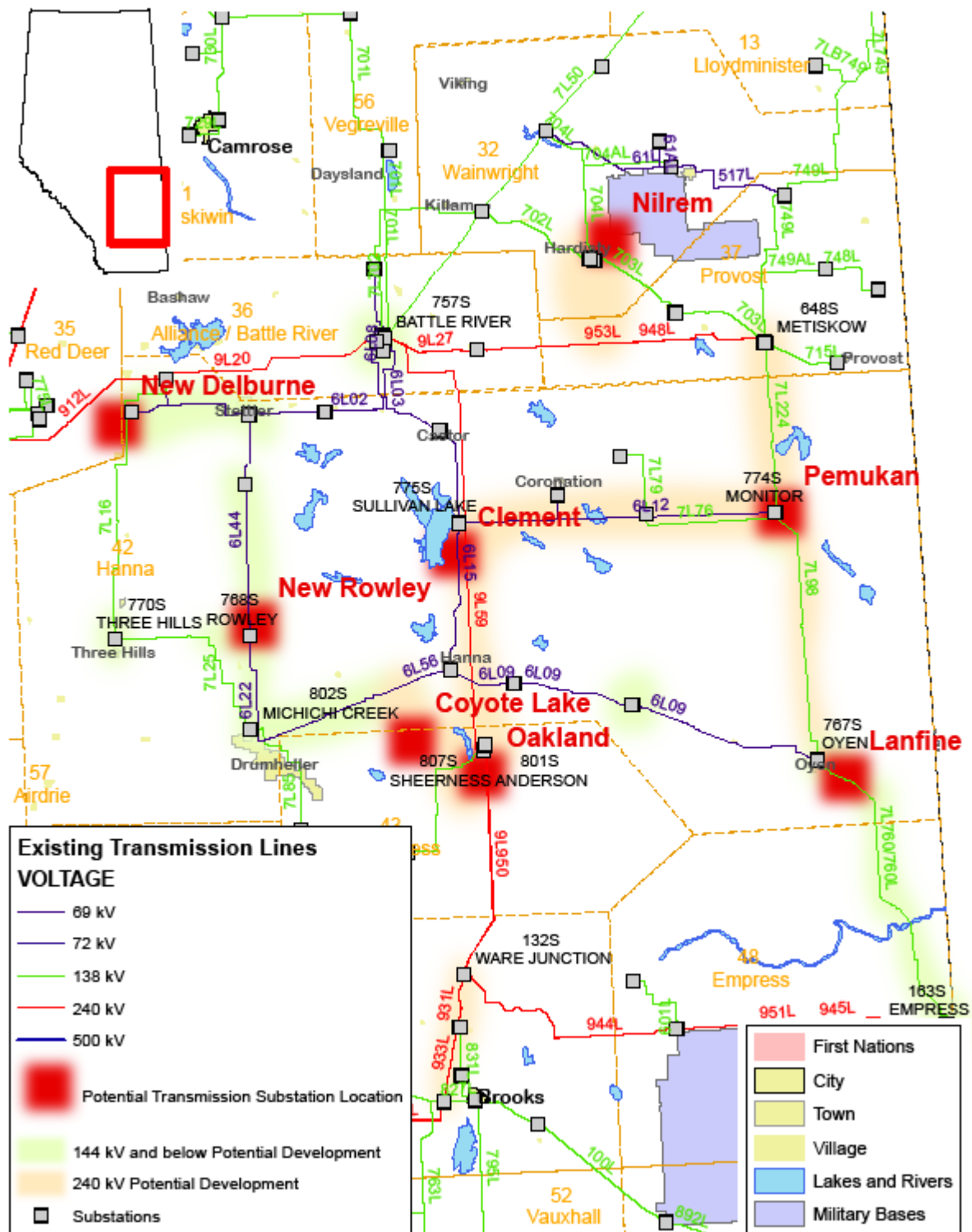
- Normal Open 72 kV line 6L09 from Hanna 763S to Richdale 776S tap at Richdale side. Richdale 776S will be on radial from Monitor 767S via 72 kV line 6L09. Keep 72 kV line 6L09 energized and it is used as a backup source to the loads at substations from Richdale to Oyen.
- Normal Open 72 kV line 6L03 from Sullivan Lake 776S to Castor 759S tap at Castor side. Castor 759S will be on radial from Battle River 757S via 72 kV line 6L03. Keep 72 kV line 6L09 energized and it is used as a backup for loads at substations close to Battle River 757S.

## **1.12 Salvaging facilities – 2017**

- 72 kV line 6L56 from Michichi Creek 802S to Hanna 763S
- 144 kV line 7L224 from Monitor 774S to KXL Keystone #2 pumping station and the pumping station will be on radial from Hansman Lake 650S via 7L224
- 144 kV line 7L760 from Oyen 767S to Bindloss 914S tap off point and Bindloss 914S and Empress Liquids 164S will be on radial from Empress 163S via 7L760/760L

## C2. Alternative 2 Detail

Figure C-3: Hanna Region Transmission System Development Alternative 2- 2012



## **2.1 Substations and switching stations – 2012**

- 240 kV Nilrem 574S substation
- 240 kV Pemukan 932S substation
- 240 kV Lanfine 959S substation
- 240 kV Oakland 946S switching station
- 240 kV Coyote Lake 963S substation
- 240 kV Clement 988S switching station

## **2.2 Major system transformers – 2012**

- Nilrem 574S – two 400 MVA 240/138 kV transformers
- Pemukan 932S – one 300 MVA 240/144 kV transformer
- Lanfine 959S – one 300 MVA 240/144 kV transformer
- Coyote Lake 963S – one 300 MVA 240/144 kV transformer

## **2.3 Transmission lines – 2012**

- 240 kV double circuit line from Nilrem 574S to 240 kV line 9L953/953L to create an in-and-out scheme on 9L953/953L to Nilrem 574S – approximately 30 km with twin bundle 477 or 795 kcmil ACSR conductor
- 240 kV line 9L966 from Hansman Lake 650S to Pemukan 932S – approximately 60 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L46 from Pemukan 932S to Lanfine 959S – approximately 68 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L14 from Clement 988S to Pemukan 932S – approximately 90 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L06 from Oakland 946S to Clement 988S – approximately 81 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L29 from Oakland 946S to Coyote Lake 963S – approximately 38 km with twin bundle 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV double circuit line 9L70 and 9L97 from Oakland 946S to Anderson 801S – approximately 7 km with twin bundle 477 or 795 kcmil ACSR conductor
- 240 kV line from Ware Junction 132S to West Brooks 28S – approximately 40 km with twin bundle 1033 kcmil ACSR conductor (double circuit line with single side strung)
- 138 kV double circuit line from Nilrem 574S to Tucuman 478S – approximately 3 km with 477 kcmil ACSR conductor
- 144 kV line 7L127 from Pemukan 932S to Monitor 774S – approximately 6 km with 477 kcmil ACSR conductor (double circuit line with single side strung)
- 144 kV line 7L132 from Lanfine 959S to Oyen 767S – approximately 6 km with 477 kcmil ACSR conductor (double circuit line with single side strung)

- 144 kV line 7L128 from Coyote Lake 963S to Michichi Creek 802S – approximately 42 km with 477 kcmil ACSR conductor

## **2.4 Voltage supporting facilities – 2012**

- Three SVCs ( $\pm 200$  MVar) each at Hansman Lake 650S, Pemukan 932S and Lanfine 959S
- Cap bank additions
  - 138 kV 27 MVar at Hardisty 377S
  - 144 kV 2\*30 MVar at Pemukan 932S
  - 144 kV 2\*30 MVar at Lanfine 959S
  - 144 kV 20 MVar at Three Hills 770S<sup>3</sup>
  - 144 kV 15 MVar at Stettler 769S<sup>4</sup>
  - 72 kV 10 MVar at Battle River 757S

## **2.5 Other system upgrades – 2012**

- Upgrade 138 kV 704L from Tucuman 478S to Hardisty 377S to 447 kcmil ACSR conductor
- Convert Stettler 769S to a 144 kV substation with a 33 MVA 144/72 kV tie transformer and add a 25 MVA 144/25 kV load transformer
- 144 kV line 7L143 from Nevis 766S to Stettler 769S – approximately 35 km with 477 kcmil ACSR conductor
- New 144 kV substation Heatburg 948S near Delburne 760S with a 144/25 kV 25 MVA load transformer (replacement of Delburne 760S)
- Approximately 1.6 km double circuit 144 kV line with 268 kcmil ACSR conductor from 144 kV line 7L16 to new Heatburg 948S to create an in-and-out scheme on 7L16 to Heatburg 948S
- New 144 kV substation Cornish Lake 954S near Rowley 768S with a 144/25 kV 25 MVA load transformer (replacement of Rowley 768S)
- Approximately 12 km 144 kV double circuit line with 268 kcmil ACSR conductor from 144 kV line 7L25 to new Cornish Lake 954S with an in-and-out scheme on 7L25 to Cornish Lake 954S
- Relocate Rowley 768S 72 kV 5 MVar cap bank to Youngstown 772S
- Reterminate 144 kV 7L79 from Monitor 774S to Pemukan 932S
- Reterminate 144 kV 7L98 from Oyen 767S to Lanfine 959S

## **2.6 Salvaging facilities – 2012**

- 144 kV line 7L760 from Oyen 767S to Bindloss 914S tap off point and Bindloss 914S and Empress Liquids 164S will be on radial from Empress 163S via 7L760/760L
- 72 kV line 6L31 between Nevis 766S and Stettler 769S, including the tap to Delburne 760S

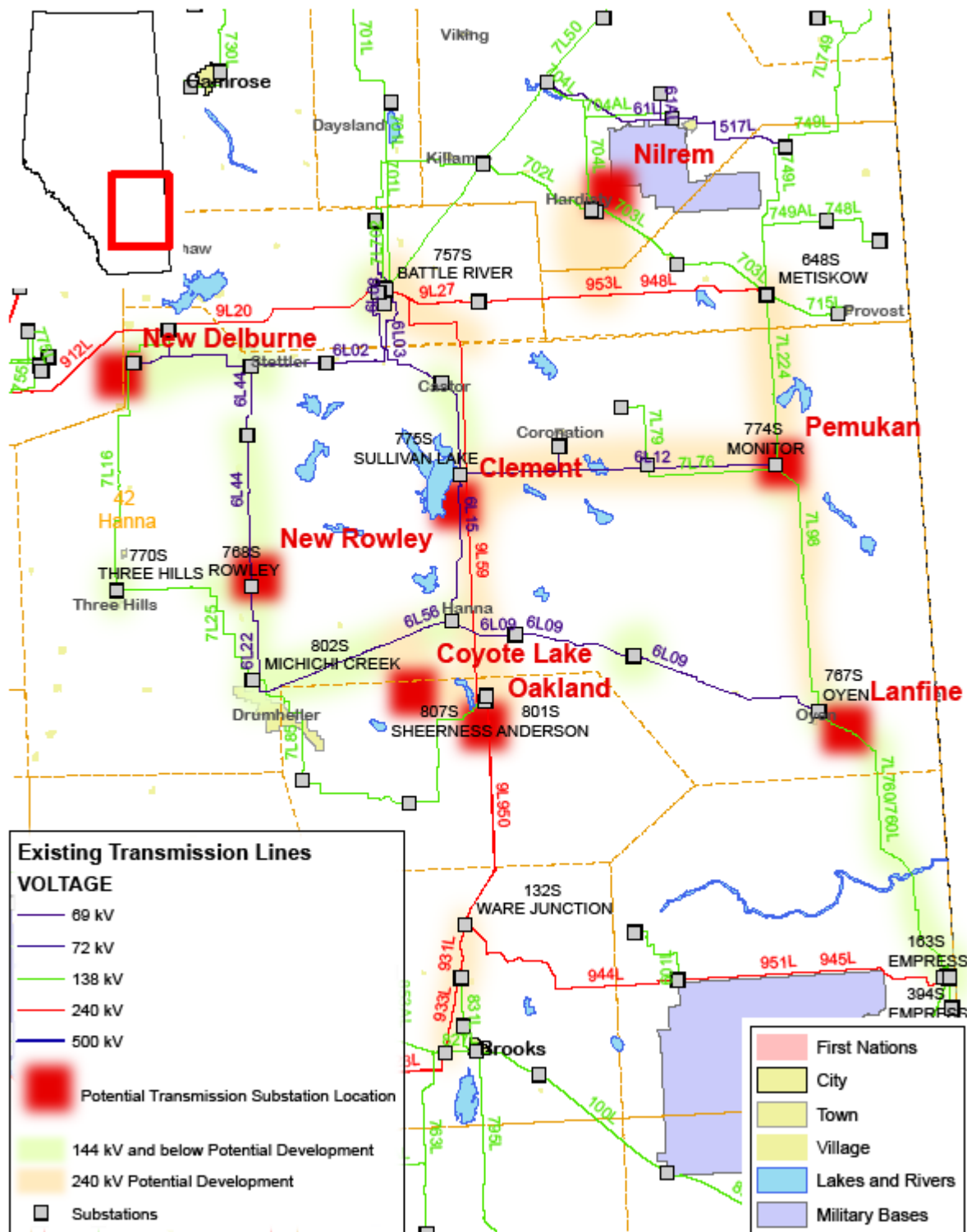
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<sup>3</sup> The size and number of the cap banks will be determined during facility application

<sup>4</sup> The size and number of the cap banks will be determined during facility application

- Stettler 769S 72/25 kV transformers 601T and 602T
- Delburne 760S
- Rowley 768S
- 72 kV line 6L44 from Rowley 768S to Big Valley 778S
- 72 kV line 6L22 from Michichi Creek 802S to Rowley 768S

**Figure C-4: Hanna Region Transmission System Reinforcement Alternative 2 - 2017**



## **2.7 Major system transformers – 2017**

- Hansman Lake 650S – one 200 MVA 240/138 kV transformer
- Pemukan 932S – one 300 MVA 240/144 kV transformer
- Lanfine 959S – one 300 MVA 240/144 kV transformer

## **2.8 Transmission lines – 2017**

- 240 kV line 9L25 from Clement 988S to Pemukan 932S – approximately 90 km with twin bundle 477 or 795 kcmil ACSR conductor – second side strung on the 240 kV D/C line
- 240 kV line 9L52 from Clement 988S to Oakland 946S – approximately 81 km with twin bundle 477 or 795 kcmil ACSR conductor – second side strung on the 240 kV D/C line
- 240 kV line 9L49 from Halkirk 401S to Cordel 755S – approximately 17 km with 477 or 795 kcmil ACSR (double circuit line with single side strung)
- 240 kV double circuit line from 240 kV line 9L59 to Clement 988S to create an in-and-out scheme on 9L59 to Clement 988S – approximately 2 km with twin bundle 477 kcmil ACSR conductor
- 240 kV line 9L31 from Oakland 946S to Coyote Lake 963S – approximately 38 km with twin bundle 795 kcmil ACSR conductor – second side strung on the 240 kV D/C line
- 144 kV line 7L141 from Pemukan 932S to Monitor 774S – approximately 6 km with 477 kcmil ACSR conductor – second side strung on the 144 kV D/C line
- 144 kV line 7L151 from Lanfine 959S to Oyen 767S – approximately 6 km with 477 kcmil ACSR conductor – second side strung on the 144 kV D/C line

## **2.9 Voltage supporting facilities – 2017**

- Cap bank additions
  - 240 kV 2\*36 MVar at Hansman Lake 650S
  - 138 kV 27 MVar at Hansman Lake 650S
  - 138 kV 27 MVar at Metiskow 648S
  - 138 kV 2\*27 MVar at Nilrem 574S
  - 72 kV 5 MVar at Youngstown 772S
  - 25 kV 2.4 MVar at Coronation 773S

## **2.10 Other system upgrades – 2017**

- Convert Hanna 763S to 144 kV substation and relocate Michichi Creek 802S 144/72/34.5 kV transformer 701T to Hanna 763S
- 144 kV line 7L108 from Coyote Lake to Hanna 763S – approximately 40 km with 477 kcmil ACSR conductor
- Normal Open 72 kV 6L09 line from Hanna 763S to Richdale 776S tap at Richdale side. Richdale 776S will be on radial from Monitor 767S via 72 kV 6L09 line. Keep 72 kV line 6L09 energized and it is used as a backup source to the loads at substations from Richdale to Oyen.

- Normal Open 72 kV 6L03 line from Sullivan Lake 776S to Castor 759S tap at Castor side. Castor 759S will be on radial from Battle River 757S via 72 kV line 6L03. Keep 72 kV line 6L09 energized and it is used as a backup for loads at substations close to Battle River 757S.

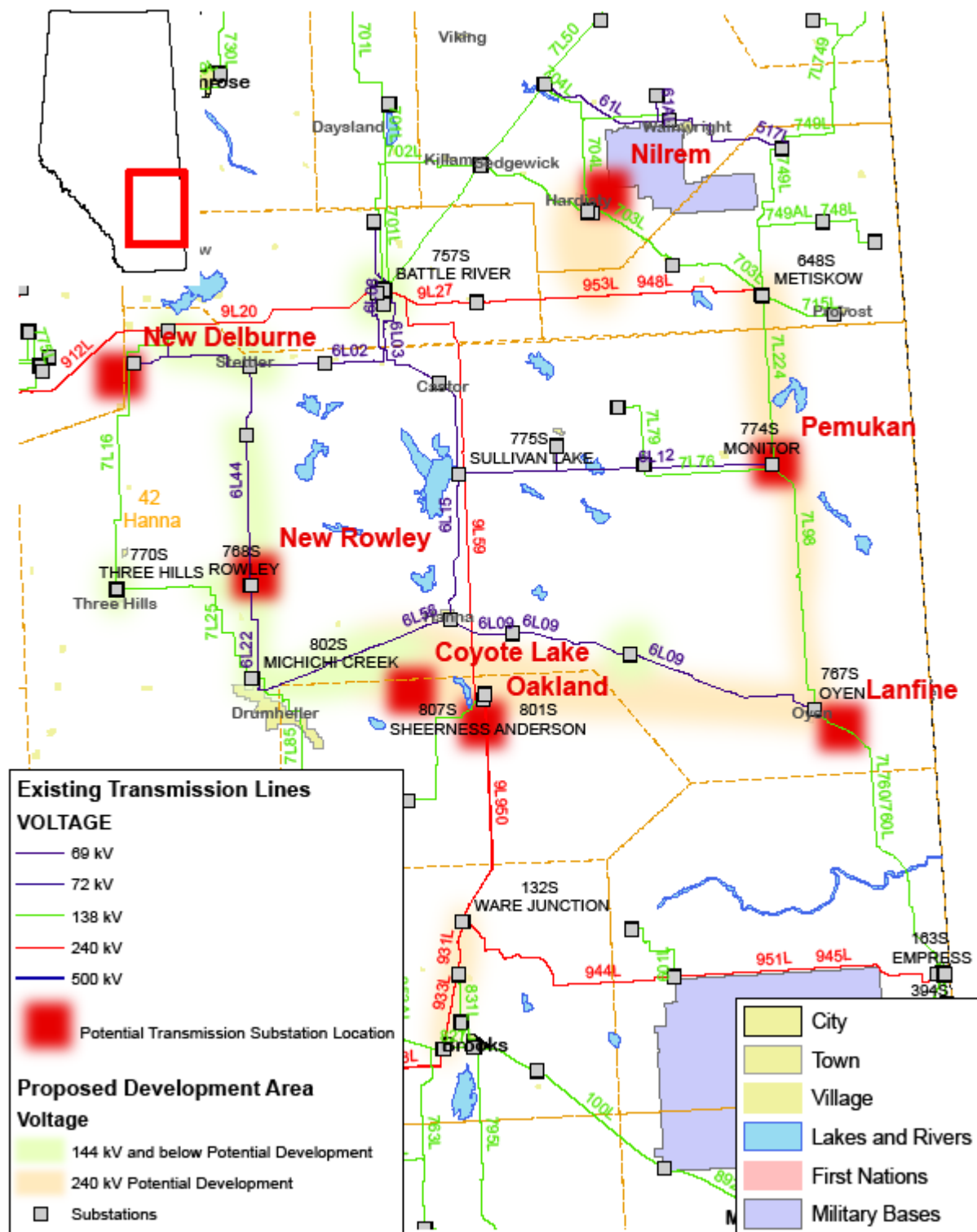
## **2.11 Salvaging facilities – 2017**

- 72 kV line 6L56 from Michichi Creek 802S to Hanna 763S
- 144 kV line 7L224 from Monitor 774S to KXL Keystone #2 pumping station and the pumping station will be on radial from Hansman Lake 650S via 7L224



### C3. Alternative 3 Detail

Figure C-5 Hanna Region Transmission System Reinforcement Alternative 3 - 2012



### **3.1 Substations and switching stations – 2012**

- 240 kV Nilrem 574S substation
- 240 kV Pemukan 932S substation
- 240 kV Lanfine 959S substation
- 240 kV Coyote Lake 963S substation
- 240 kV Oakland 946S switching station

### **3.2 Major system transformers – 2012**

- Nilrem 574S – two 400 MVA 240/138 kV transformers
- Pemukan 932S – one 300 MVA 240/144 kV transformer
- Lanfine 959S – one 300 MVA 240/144 kV transformer
- Coyote Lake 963S – one 300 MVA 240/144 kV transformer

### **3.3 Transmission lines – 2012**

- 240 kV double circuit line from Nilrem 574S to 240 kV line 9L953/953L to create an in-and-out scheme on 9L953/953L to Nilrem 574S – approximately 30 km with twin bundle 477 or 795 kcmil ACSR conductor
- 240 kV line 9L966 from Hansman Lake 650S to Pemukan 932S – approximately 60 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L46 from Pemukan 932S to Lanfine 959S – approximately 68 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L24 from Oakland 946S to Lanfine 959S – approximately 87 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L29 from Oakland 946S to Coyote Lake 963S – approximately 38 km with twin bundle 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV double circuit line 9L70 and 9L97 from Oakland 946S to Anderson 801S – approximately 7 km with twin bundle 477 or 795 kcmil ACSR conductor
- 240 kV line from Ware Junction 132S to West Brooks 28S – approximately 40 km with twin bundle 1033 kcmil ACSR conductor (double circuit line with single side strung)
- 138 kV double circuit line from Nilrem 574S to Tucuman 478S – approximately 3 km with 477 kcmil ACSR conductor
- 144 kV line 7L127 from Pemukan 932S to Monitor 774S – approximately 6 km with 477 kcmil ACSR conductor (double circuit line with single side strung)
- 144 kV line 7L132 from Lanfine 959S to Oyen 767S – approximately 6 km with 477 kcmil ACSR conductor (double circuit line with single side strung)
- 144 kV line 7L128 from Coyote Lake 963S to Michichi Creek 802S – approximately 42 km with 477 kcmil ACSR conductor

### **3.4 Voltage supporting facilities – 2012**

- Three SVCs ( $\pm 200$  MVar) each at Hansman Lake 650S, Pemukan 932S and Lanfine 959S
- Cap bank additions
  - 138 kV 27 MVar at Hardisty 377S
  - 144 kV 2\*30 MVar at Pemukan 932S
  - 144 kV 2\*30 MVar at Lanfine 959S
  - 144 kV 20 MVar at Three Hills 770S<sup>5</sup>
  - 144 kV 15 MVar at Stettler 769S<sup>6</sup>
  - 72 kV 10 MVar at Battle River 757S

### **3.5 Other system upgrades – 2012**

- Upgrade 138 kV 704L from Tucuman 478S to Hardisty 377S to 447 kcmil ACSR conductor
- Convert Stettler 769S to a 144 kV substation with a 33 MVA 144/72 kV tie transformer and add a 25 MVA 144/25 kV load transformer
- 144 kV line 7L143 from Nevis 766S to Stettler 769S – approximately 35 km with 477 kcmil ACSR conductor
- New 144 kV substation Heatburg 948S near Delburne 760S with a 144/25 kV 25 MVA load transformer (replacement of Delburne 760S)
- Approximately 1.6 km double circuit 144 kV line with 268 kcmil ACSR conductor from 144 kV line 7L16 to new Heatburg 948S to create an in-and-out scheme on 7L16 to Heatburg 948S
- New 144 kV substation Cornish Lake 954S near Rowley 768S with a 144/25 kV 25 MVA load transformer (replacement of Rowley 768S)
- Approximately 12 km 144 kV double circuit line with 268 kcmil ACSR conductor from 144 kV line 7L25 to new Cornish Lake 954S with an in-and-out scheme on 7L25 to Cornish Lake 954S
- Relocate Rowley 768S 72 kV 5 MVar cap bank to Youngstown 772S
- Reterminate 144 kV 7L79 from Monitor 774S to Pemukan 932S
- Reterminate 144 kV 7L98 from Oyen 767S to Lanfine 959S

### **3.6 Salvaging facilities – 2012**

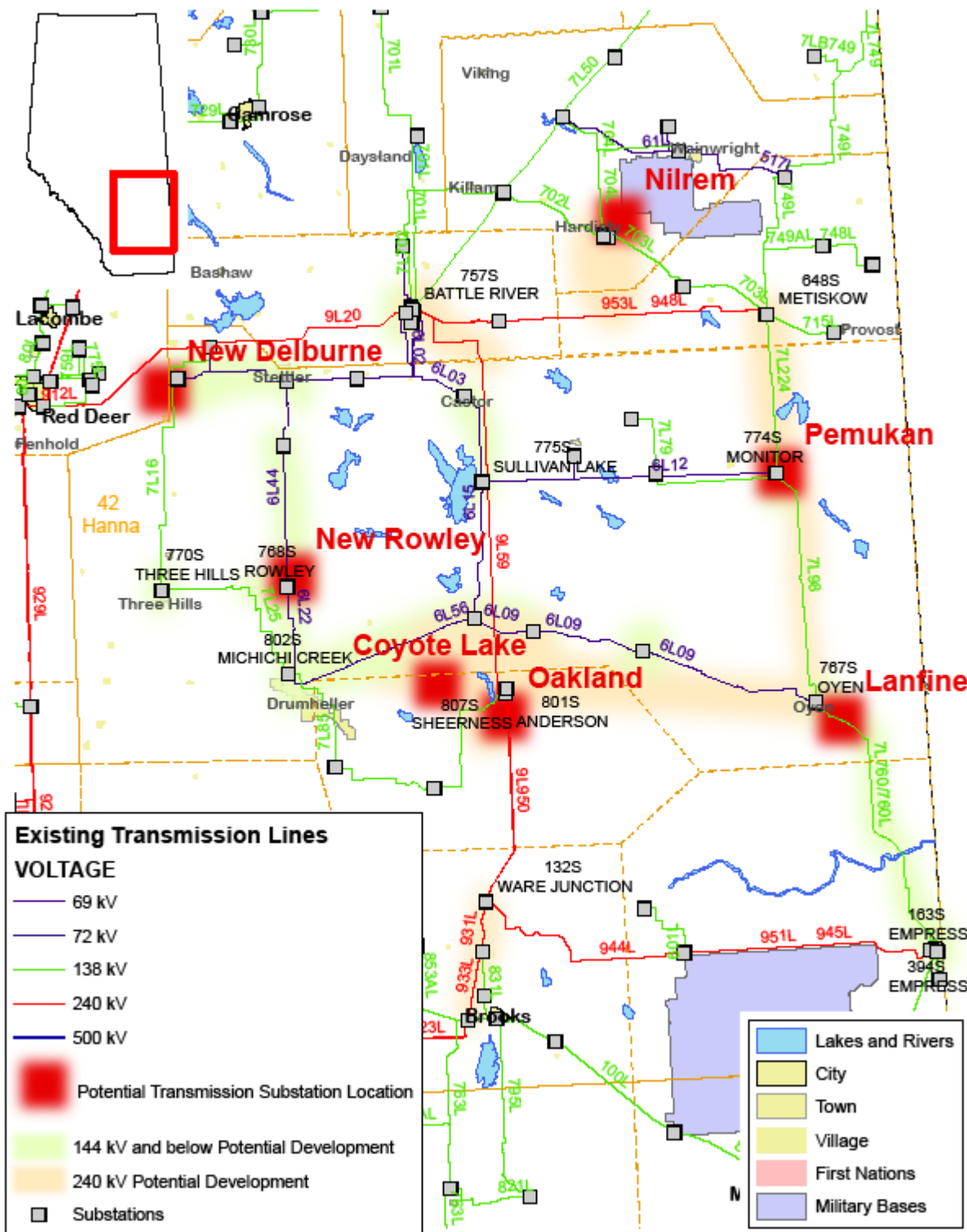
- 144 kV line 7L98 from Monitor 774S to Excel 910S
- 72 kV line 6L31 between Nevis 766S and Stettler 769S, including the tap to Delburne 760S
- Stettler 769S 72/25 kV transformers 601T and 602T
- Delburne 760S
- Rowley 768S
- 72 kV line 6L44 from Rowley 768S to Big Valley 778S
- 72 kV line 6L22 from Michichi Creek 802S to Rowley 768S
- Strung second 240 kV line from Oakland 946S to Lanfine 959S

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<sup>5</sup> The size and number of the cap banks will be determined during facility application

<sup>6</sup> The size and number of the cap banks will be determined during facility application

**Figure C-6: Hanna Region Transmission System Development Alternative 3- 2017**



### **3.7 Major system transformers – 2017**

- Lanfine 959S – one 300 MVA 240/144 kV transformer
- Pemukan 932S – one 300 MVA 240/144 kV transformer
- Hansman Lake 650S – one 200 MVA 240/138 kV transformer

### **3.8 Transmission lines – 2017**

- 240 kV line 9L49 from Halkirk 401S to Cordel 755S – approximately 17 km with twin bundle 477 or 795 kcmil ACSR conductor (double circuit line with single side strung)
- 240 kV line 9L31 from Oakland 946S to Coyote Lake 963S – approximately 38 km with twin bundle 795 kcmil ACSR conductor – second side strung on the 240 kV D/C line
- 240 kV line 9L65 from Oakland 946S to Lanfine 959S – approximately 87 km with twin bundle 477 or 795 kcmil ACSR conductor – second side strung on the 240 kV D/C line
- 144 kV line 7L141 from Pemukan 932S to Monitor 774S – approximately 6 km with 477 kcmil ACSR conductor – second side strung on the 144 kV D/C line
- 144 kV line 7L151 from Lanfine 959S to Oyen 767S – approximately 6 km with 477 kcmil ACSR conductor – second side strung on the 144 kV D/C line

### **3.9 Voltage supporting facilities – 2017**

- Cap bank additions
  - 240 kV 2\*36 MVar at Hansman Lake 650S
  - 138 kV 27 MVar at Hansman Lake 650S
  - 138 kV 27 MVar at Metiskow 648S
  - 138 kV 2\*27 MVar at Nilrem 574S
  - 72 kV 5 MVar at Youngstown 772S
  - 25 kV 2.4 MVar at Coronation 773S

### **3.10 Other system upgrades – 2017**

- Convert Hanna 763S to 144 kV substation and relocate Michichi Creek 802S 144/72/34.5 kV transformer 701T to Hanna 763S
- 144 kV line 7L108 from Coyote Lake to Hanna 763S – approximately 40 km with 477 kcmil ACSR conductor
- Normal Open 72 kV line 6L09 from Hanna 763S to Richdale 776S tap at Richdale side. Richdale 776S will be on radial from Monitor 767S via 72 kV line 6L09. Keep 72 kV line 6L09 energized and it is used as a backup source to the loads at substations from Richdale to Oyen.
- Normal Open 72 kV line 6L03 from Sullivan Lake 776S to Castor 759S tap at Castor side. Castor 759S will be on radial from Battle River 757S via 72 kV line 6L03. Keep 72 kV line 6L09 energized and it is used as a backup for loads at substations close to Battle River 757S.

### **3.11 Salvaging facilities – 2017**

- 72 kV line 6L56 from Michichi Creek 802S to Hanna 763S
- 144 kV line 7L224 from Monitor 774S to KXL Keystone #2 pumping station and the pumping station will be on radial from Hansman Lake 650S via 7L224
- 144 kV line 7L760 from Oyen 767S to Bindloss 914S tap off point and Bindloss 914S and Empress Liquids 164S will be on radial from Empress 163S via 7L760/760L